

# Everybody's Guilty

## The Ecological Dilemma

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LEARNED CITATIONS to scientific articles and massive monographs are all right when things are going smoothly, but when the going gets rough we have to call upon the poets and the humorists for help. They know so well how to slash through a mass of irrelevancies to get to the guts of a problem. Let's ask one of the best of them, Art Hoppe, to set us straight on our current situation:

Once upon a time a young man named Irwin gave up protests. He gave up protesting Vietnam, the draft, sexually segregated rest rooms and pigs on campus.

"Ecology is the one true cause!" said Irwin nobly, just like most young people of the time. I shall devote myself to making a more beautiful world."

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"The great thing about ecology as a cause," said Irwin, happily, "is that everybody's guilty."

And with that he proceeded to set fire to the family car, tip over the family barbecue and smash up all two-and-a-half toilets in the family's two-and-a-half-bath house.

When he'd gone, his parents ruefully surveyed the wreckage. "I think I liked it better," said his mother with a sigh, "when he was only mad at the President, the university, the police and the Army."<sup>1</sup>

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The great thing about ecology as a cause is that everybody's guilty. It's true. That's what makes it so difficult to accept. Life would be easy if we could blame all this mess on money-mad industrialists or long-haired hippies. But we can't; we are *all* guilty. We all acquiesce in the system

of arrangements and practices that has created our ecological crisis.

### Ecological Systems

These arrangements and practices are supported by a system of words that helps hide reality from us. This was one of the messages of Rachel Carson's *Silent Spring*,<sup>2</sup> which touched off the present revolution less than ten years ago. After reviewing a mountain of evidence of the harm done by pesticides, Miss Carson pointed out that our minds had been coerced into false perceptions by the very name used for the chlorinated hydrocarbons: "pesticides." Such substances should be called "biocides," because they kill living things. When we use the more restricted name we are no better than the most primitive savage. We cannot coerce a biocide into killing only pests by calling it a pesticide; that is sheer word-magic. Miss Carson did not endear herself to the chemical industry with this analysis. Nothing is resented quite so much as semantics, particularly when it is turned against vested interests. "Oh, that's only semantics," the victim says—as if naming the weapon could heal the wound.

Rachel Carson had more to offer than mere semantics, however. She also offered the general public a new world view. To a small number of scholars this view was not new, but to most people—even to most scientists—it was. This view was that of *the world as an ecological system*. . . . Unfortunately, those are only words. They need to be given meaning.

Let us begin with a quotation from Charles Darwin's *Origin of Species*, written more than a hundred years ago:

The number of humble-bees in any district

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depends in a great measure upon the number of field-mice which destroy their combs and nests; and Col. Newman who has long attended to the habits of humble-bees, believes that "more than two-thirds of them are thus destroyed all over England." Now the number of mice is largely dependent, as everyone knows, on the number of cats; and Col. Newman says, "Near villages and small towns I have found the nests of humble-bees more numerous than elsewhere, which I attribute to the number of cats that destroy the mice." Hence it is quite credible that the presence of a feline animal in large numbers in a district might determine, through the intervention first of mice and then of bees, the frequency of certain flowers in that district!

This story was later improved upon by some Victorian Art Hoppe who embroidered it as follows. It is well known that old maids keep cats. Red clover requires humble bees as pollinators, and it is well known that clover hay is fed to the horses of the British cavalry. From all of this, "it logically follows" that the continuation of the British Empire is dependent upon England's always having a bountiful supply of old maids. The logic is irrefutable; and the facts are not wholly fantastical.

The great practical moral that comes out of the ecological view of the world is precisely this: *We can never do merely one thing*. The title of Rachel Carson's book derives from the oft-repeated observation that the application of insecticides to the landscape frequently results in a massive killing of birds. Persistent pesticides are biologically concentrated as they are moved up the food chain. George Woodwell and his colleagues<sup>3</sup> have shown that DDT in the water of estuaries is concentrated one thousand times in being incorporated in the zooplankton. As organic matter is moved along the food chain from plankton to fish to carnivorous birds, there is a further concentration of one thousand times. In other words, there is a million-fold concentration of this poisonous material as it passes from water to the birds.

There is a Danish proverb that says: "Do not despise a small wound, a poor relative, or a humble enemy." Neither can we afford to ignore a small concentration of a poison in the environment. Biological processes can concentrate it and present us with troubles we didn't even know we had. Because DDT interferes with the meta-

bolic processes of egg-shell formation, peregrine falcons (duck hawks) are nearly extinct on the East Coast,<sup>4</sup> and pelicans are rapidly becoming so on the West Coast. What the concentration does to human beings we still do not know, but ignorance is no cause for complacency. It should worry us to know that some 400 chemicals are now being used in the control of weeds, insects, nematodes, rodents and plant diseases.<sup>5</sup> It is doubtful if a single one of them has been adequately tested for long-term safety. Of course our intention is to kill only weeds, insects, nematodes, rodents, or plant pathogens. But Hell, as the English proverb has it, is paved with good intentions.

### Consequences of "Progress"

We can never merely do one thing. Consider the consequences of damming the Nile at Aswan.<sup>6</sup> During the twentieth century a series of dams have been built there, culminating in the "High Dam" finished in the 60's. All that men intended to do was to secure a dependable source of water for irrigation, and to generate a bit of electricity. But we have done more, of course—much more, as Egypt (the supposed beneficiary) is learning to her sorrow.

To begin with, the Aswan High Dam, like all dams, will rapidly be made useless by the depositing of silt behind the dam. Deprived of this fertile silt, the flood plains below the dam will soon have to be artificially fertilized, for the first time in 5,000 years. Deprived of the flushing action of periodic floods, the irrigated plains will now become saline, ultimately being rendered useless unless expensive counter-measures are taken. Substituting continuous irrigation for periodic floods has favored the multiplication of water snails, resulting in a tragic increase in schistosomiasis among the Egyptians. The great delta of Egypt, deprived of yearly accretions of sediment by the river in flood, is now being eroded away into the Mediterranean, diminishing the agricultural acreage available to the food-hungry nation. And the last devastation extends even beyond national boundaries: because of the loss of flood-borne nutrients, the sardine catch in the eastern Mediterranean has diminished from 18,000 tons a year to 400 tons—a 97 per cent loss. . . . But our intention was to do only one thing.

The story of the Aswan dam is not unique;

many similar tragedies are now known, though they have not been adequately publicized. Interventions in nature should always be suspect. We know so little of the total ecology of any region that we bulldoze at our peril. By damming the Nile we intended to increase both the quantity and quality of life. We may have succeeded in increasing the quantity; the quality has certainly been decreased. In the long run, the quantity itself may suffer.

Even what we call "success" may prove to be a bitter failure. Increasing the size of the population is generally held to be a good thing, but an ever larger proportion of the world's people is becoming convinced that the world is already overpopulated. Three hundred and fifty years ago the English poet and theologian John Donne wrote: "Every man's death diminishes me." The insight was both humane and ecological, but now that we have seven times as many people, at least a third of whom are living in misery, it would be much nearer the truth (and ultimately more humane) to say: "Every babe's birth diminishes me."

The ethical dilemma posed by our new-found ability to save lives has never been expressed more poignantly than by the English physiologist A. V. Hill:

The dilemma is this. All the impulses of decent humanity, all the dictates of religion and all the traditions of medicine insist that suffering should be relieved, curable diseases cured, preventable disease prevented. The obligation is regarded as unconditional: it is not permitted to argue that the suffering is due to folly, that the children are not wanted, that the patient's family would be happier if he died. All that may be so; but to accept it as a guide to action would lead to a degradation of standards of humanity by which civilization would be permanently and indefinitely poorer. . . .

Some might [take] the purely biological view if men will breed like rabbits they must be allowed to die like rabbits. . . . Most people would still say no. But suppose it were certain now that the pressure of increasing population, uncontrolled by disease, would lead not only to widespread exhaustion of the soil and of other capital resources but also to continuing and increasing international tension and disorder, making it hard for civilization itself to survive: Would the majority of humane and reasonable people then change their minds?

If ethical principles deny our right to do evil in order that good may come, are we justified in doing good when the foreseeable consequence is evil?<sup>7</sup>

Should medical men feel guilty because they help to increase the population of the world, and hence presumably its misery as well? I think not, for several reasons. In the first place, even though intentions *are* the paving blocks of Hell, intentions *do* matter. It does matter that medical researchers and practitioners have intended well. They did not foresee the ultimate consequences of saving lives—but then who did? The physicians' ignorance was mankind's ignorance. It is not the past, but the future to which we must give our attention. What are we to do in the future?

Certainly mankind would not tolerate an abandonment of the blessings of modern medicine. Nor would physicians make such a proposal, no matter how aware they might be of the population problem. They could rightly insist that the answer to population problems lies largely outside of medicine—in ethics and politics, to be specific.

### "Popollution" Problems

In the poorest two-thirds of the world overpopulation means starvation and the threat of it. In wealthy United States the most conspicuous symptom of overpopulation is pollution—of the air, the water, the earth and (to be only slightly metaphorical) of the human psyche.

Pollution, like sin, is one of those things that everyone is officially against—but no one wants to pay the price of getting rid of it. But we will have to if we are to survive. The price comes in two parts. The first part is the technological price. For the United States, this price is estimated to be at the very minimum ten billion dollars a year for many years to come. This would be just the price of a clean-up job. Even after we set our house in order there is a large and continuing maintenance cost for pollution control systems. How large is not known.

But that is not all. We must take account of the escalation of pollution as the result of further population growth and further per capita consumption of natural resources (and conversion of those resources into pollutants). It is interesting to note that continued growth in population and prosperity is routinely assumed in most economic prognostications, but is equally rou-

tinely ignored when people discuss the pollution problem. If we take seriously the assumption that population will continue to grow, and will be accompanied by a continued increase in per capita consumption, we discover the second half of the price for pollution control. Let's take a look at the logic of the problem.

What happens when the population doubles, going from  $1x$  to  $2x$ ? Does the pollution,  $y$ , simply go from  $1y$  to  $2y$ ? First of all, let's assume that it does and see what the consequences are. With respect to many kinds of pollution we cannot calculate the cost by simply dividing the amount of pollution by the number of people. Although it is true that  $x \div y = 2x \div 2y$ , this does not give a measure of the effect of pollution on the individual. If it is air that is being polluted, when the pollution is doubled with a doubling of the population, this means that twice as many people are being assaulted *twice* as hard by pollution. To keep the pollution from getting no worse we will have to reduce the total load of pollution in the air to its original level. How will we do that, and what will be the cost? It is unlikely that we will do so by processing the whole mass of the atmosphere. We must exert technological control at the source. This means that with a doubling of the population the *standards* for emission at each source must be divided by 2. Multiplying the population by  $n$  requires that emission standards be multiplied by  $1/n$ .

What will be the cost of this purification? There are many technologies, and many different prices, but it is safe to say that the cost of a purification process is a "power function." That is, if we make the standard twice as rigorous, we more than double the cost of achieving that standard. This means that as population increases the cost of controlling pollution increases even faster. To keep at the same level of well-being, a larger population must devote more of its income to combating pollution.

Another theoretical consideration points to the same sort of conclusion. Consider the problem of communication, an increasingly important aspect of a mass society.<sup>8</sup> No one wants to communicate with everyone in his society, but there surely is no doubt but that the people in a large society need to communicate with more people than do the citizens of a small village. What is the relation between the communication load

and the effective size of the population within which communication takes place? Putting this in very general mathematical terms we can ask: How many communication relationships ( $r$ ) are there in a sub-population of  $x$  people? The answer is:  $r = \frac{x(x-1)}{2} = x^2$

The communication load of a group goes up approximately as the square of the number of people in the group. This is a power function. We cannot escape this truth; we can merely evade it. We can shorten the time spent communicating with other people and thus adjust to a larger population. No doubt we do this in part: contrast a New York telephone conversation with a roadside chat in the Panhandle of Texas. But there is a limit to how much one can shorten the units of communication and still reach an understanding. Another way of evading the simple mathematical implications of this relationship is by withdrawing somewhat from the world, by erecting high psychic walls to keep at bay the ever-increasing hordes of people outside. This adjustment also we make. The larger the city, the less the neighborliness, the less willing people are to become involved with the problems of others. In the extreme, this leads to such horrors as the murder of a Kitty Genovese, while neighbors listen to the screams and do nothing about it. "No man is an island," said John Donne—but in their actions the citizens of Megalopolis deny Donne daily—as *they must*, if they are to keep their sanity. Roughly speaking, insularity increases as the square of population size. (To put it another way, the cost of *not* becoming insular, if people are willing to pay the price, must increase as the square of population size.)

Because of our commitment to the holy idea of Progress, we have not done our homework in calculating the true cost of population increase. At the moment we have very few empirical measures of this cost. For amusement, I have calculated some of the more easily ascertainable costs, which are exhibited in Table 1.

The figures in the table cover a decade and a half in the middle of the twentieth century. During this time the population increased at an average rate of 1.7 percent per year. At the same time the number of telephone conversations per person per year increased at 4.9 percent per year. This is more than we would have expected on the basis on the formula given above. If the

**TABLE 1. Average Annual Rates of Growth of Various Activities in the United States, 1950-1965**

Statistic	Percentage Increase Per Year
Population	1.7
*Hunting Licenses Sold	2.9
*Fishing Licenses Sold	3.4
Motor Vehicles Registered	4.1
Average Daily Number of Phone Conversations	4.9
Annual Number of Visitors to National Parks	8.2
*Annual Number of Campers in National Forests	14.7

\*Terminal year, 1964.

Source: Calculated from data in the *Pocket Data Book, USA 1967*.<sup>9</sup>

population increases from 1.0 to 1.017 in a year the communication load should increase to the square of 1.017, which is 1.034289. This would be an increase of 3.4 percent. In fact, the increase observed (4.9) is 44 percent greater than expected. The truth is worse than the prediction. Why?

Various reasons can be given for this, among them the greater willingness of a younger generation raised in an atmosphere of telephones to use the telephone, and the slow but steady lowering of the cost of telephone service through technology improvement. Also importantly involved is the increased prosperity of the population as a whole, changing telephone service from a luxury to a readily accepted necessity of everyday life. To put it simply, we can regard the increase in the use of the telephone as a function of both the increase in population size and the increase in the level of prosperity.

Taking this double view of causation, we can make sense of all of the statistics given in the table. Since "prosperity," as ordinarily measured, is no doubt a factor in all of these increases, we must beware of an important pitfall in interpreting them. Most civic boosters of a commercial turn of thought, casting their eyes down this row of figures, no doubt glow with pride at their magnitude. All of these statistics, all of these accepted measures of prosperity, are going up faster than the general population. Surely, this must be good! A little thought shows that it just as surely is *not* good.

Consider all those hunting and fishing licenses sold—does this mean that hunting and fishing have improved in quality? Or even that more fish have been caught and more deer shot? If we know anything about the changes that have

taken place in our time, we know that this is not true. Hunting and fishing have become steadily worse. The crucial point is this: the number of fish to be caught per year, and the number of deer to be shot, is essentially a constant (at best) because the area available for hunting and fishing is certainly not increasing—in fact, it is decreasing. Therefore, the increased number of licenses sold is a measure not of an improvement in the quality of life, but of the degradation of life through increasing congestion—and of the eternal optimism of hunters and anglers!

Even more striking is the increase in the number of visitors to the national parks, and the number of campers in the national forests—the latter increasing at an astonishing 14.7 percent per year. This certainly does not mean that we have more Waldens in the United States now; anyone who has tried to camp in a national forest in recent years knows that we merely have more Coney Islands scattered throughout the continent. We have succeeded in creating alfresco slums. That is nothing to crow about.

If we use the word pollution in a very loose sense to include the related phenomena of congestion and the exhaustion of resources, we can write a simple equation that indicates the dimensions of the pollution problem: population  $\times$  prosperity = pollution.

The essential connection of population and pollution has led a number of people to coin (apparently independently) the word *popollution*. It is a mistake to think that we can solve pollution problems by purely technological means. In the last analysis, pollution will not be controlled unless population is controlled.

## Population Control: Medical Responsibilities

But how do we control population? Who controls it? How? We will surely be wrestling with this question for a long time to come. Because community consensus is so difficult to achieve, we are always tempted to issue a clarion call for individual action, in the name of social conscience. But it is now clear that overpopulation cannot be stopped by individual consciences. Kingsley Davis has pointed out that, in every country in which we have adequate statistics, women want more children than the nation needs to achieve zero population growth.<sup>10</sup> This means,

to put the matter bluntly, that the goal of the Planned Parenthood movement, "Every Child a Wanted Child," though admirable is not sufficient. If only wanted children are born the population will grow out of control.

This fact has deep theoretical roots. If we try to control population by an appeal to individual consciences, we set up a selective system that favors the conscienceless.<sup>11</sup> That is, those members of society who resist the call to have fewer families will leave more descendants than will those who respond to such a call. Therefore, in the long run, a purely voluntary system of birth control cannot achieve the goal of national (or international) population control. In the long run, some form of community coercion—gentle or severe, explicit or cryptic—will have to be employed. In the long run.

Community control of breeding is so revolutionary an idea that we cannot institute it immediately. For the near future, we will have to look toward voluntarism and persuasion to help create a climate of opinion that can some day support stronger measures. Physicians can, and should, play a key role in helping to create the new climate of opinion that must prevail if we are to survive in comfort and dignity.

To begin with, we must have a *complete* system of birth control. It must be 100 percent effective. No single method of contraception is completely effective, nor should we expect any to be. A one percent failure rate, which is probably the best we can achieve with a contraceptive pill at a dosage level that produces minimal side effects, will (by definition) produce only one pregnancy per year among a hundred women exposed to the risk of pregnancy. That does not sound like much. But with 25 million women at risk in the United States this amounts to a quarter of a million of unwanted pregnancies annually. This is not a small number. If every child is to be a wanted child, we need abortion as a back-up measure for whatever methods of contraception are used. No *method* is 100 percent reliable, but the *system* of birth control can be 100 percent reliable if it includes abortion for contraceptive failure. (Operationally, because of the private nature of sexual acts, one cannot insist that abortion be permitted only for instances of *proved* contraceptive failure; in practice one must permit it for all failures, whatever their causes.)

From the point of view of the community it is

highly desirable that all birth control services, including abortion, be available at minimal charge, preferably free. The true alternative to abortion *when it is needed* is not contraception—it's too late for that—but continued pregnancy and childbirth.<sup>12</sup> At any given level of medical care, childbirth costs much more than abortion. And if the child is unwanted—which is always the case when an abortion is requested—then we must add to the cost of lying-in the cost resulting from being unwanted. Hard data from Sweden<sup>13</sup> confirm what intuition tells us, namely, that the cost to the community of an unwanted child is greater than the cost of a wanted child. Swedish children born to mothers whose requests for abortion had been turned down by the medical profession had a higher rate of criminal delinquency, of alcoholism, of psychiatric care, and of medical costs in general as they grew up, as compared with wanted children.

Even when children are wanted, experience indicates that those who are born into a large family are not as well taken care of as children in a small one. This is a statistical truth, despite the message of popular books and movies about the joys of large families. A protein-deficient diet during development permanently diminishes learning ability.<sup>14</sup> In other mammals there are "critical periods" for learning;<sup>15</sup> a young animal that fails to be exposed to the relevant experiences during such a critical period can learn what he needs to know later only with difficulty or not at all. It is not known for certain that the concept of the critical period applies to human development, but the suspicion that it does is strong enough to justify the "Head Start Program" for underprivileged children.

If over-large families statistically cause a greater proportion of malnutrition, both dietary and psychological, what should be the medical response? Ideally, one might demand that society assume more of the burden of the parents. In spite of widespread good intentions, society's performance in this regard is less than perfect. The physician is almost helpless in correcting the consequences of over-fertility; but he does have some ability, as an individual counselor, to discourage fertility itself—and some responsibility to do so, in order to diminish the amount of adult stupidity, which itself is a form of social pollution, and a most dangerous one. It may be difficult for an obstetrician to bring himself to dis-

courage exuberant fertility among his patients, but his civic responsibility is clear.

One of the most effective and satisfactory ways of achieving birth control is by sterilization. Except for Utah, no state prohibits voluntary sterilization as a means of contraception. But in most communities the patient desiring a sterilization finds that he really has to fight for it. Many physicians have a great reluctance to operate on a person who has few or no children. The medical attitude is clearly contrary to public interest in this day of overpopulation. Why do physicians make this difficulty?

The reason many physicians drag their feet in performing sterilizations is not that they are physicians, but that they are partakers of the general culture, for they breathe in the atmosphere of the entire community. For thousands of years, Western culture has been a male-dominated culture, a culture that worships what Mexicans call *machismo*, an attitude that measures manliness by fertility. Literature is saturated with pro-natalist sentiments. The child who is destined to become a physician imbibes these sentiments long before he enters medical school. It is small wonder that he has trouble later divesting himself of his inheritance and looking at the matter in strictly rational terms, in terms of the interest of the whole community, which is no longer a pro-natalist interest.

It will not be easy for many physicians to accept the legitimacy of sterilization as an individual decision, especially for a person who has no children; it will not be easy for the medical profession to divest itself of such now maladaptive resistance. Fortunately, the recent emergence of sterilization from a long taboo is helping to create the climate of opinion that is needed for rationality. Wider acceptance of vasectomy has given a great boost to the cause of truly effective birth control, and hence to the possibility of eventually achieving population control.

### Stages in Population Control

It is not the physician's duty to bring about population control. But he does have an opportunity to help create a climate of opinion in which population control can ultimately be achieved. We can foresee the stages<sup>16</sup> in which progress will be made toward this goal (the stages, of course, overlap).

First, purely voluntary control must be made completely effective. This will require that abortion and sterilization be made completely available to all, in the fullest cultural, psychological, and economic senses.

Second, our education must be revamped to minimize—not completely remove—pro-natalist aspects. At the present time, little girls are exposed in their elementary schooling only to stories that emphasize a single goal—growing up and becoming a mommy. We need to enrich the school readers with stories that emphasize other goals for little girls—work and careers outside the home.<sup>17</sup> Those who have close contact with young women know that even now many of them have children not because they really want them for themselves, but because they feel under strong social pressure (by their own parents, among others) to have children. We need to educate all of society so as to reduce this social pressure, and consequently reduce the number of semi-reluctant mothers, who are probably not the best ones to raise children anyway. We must get out of the habit of speaking to little girls as if the only good life open to them as adults is motherhood. Because of their great charisma in the eyes of children, physicians are probably more effective in establishing models in the minds of developing girls than are most other members of society; being more effective, they bear a heavier load of responsibility for keeping the needs of society in mind as they speak to their little patients.

Third, we need to explore the possibility of using tax incentives to diminish reproduction. Raymond Cowles<sup>18</sup> long ago suggested that we give a yearly bonus to each woman between the age of 15 and 25 whenever she managed to get to the end of the year without having a baby (whether she was married or not, whether she was rich or poor). Kenneth Boulding has proposed that we regulate reproduction by a system of "green stamps"—rights to have children—which could be bought and sold in the market, like stock options.<sup>19</sup> These proposals may or may not be politically feasible; but they certainly point the way. We need to be inventive in these matters.

Last of all will come positive community control of the number of children produced. The time is not yet ripe for this, but for the reasons previously given we shall no doubt have to come to it. (We will not have to come to it if we get

caught up in a storm of thermonuclear war, or if some new and utterly devastating disease sweeps across the world like the black plague of the Renaissance. But we must make our plans on the assumption that no such dreadful things happen.) Achieving community control will require even more ingenuity than devising indirect incentives for birth control. We do not have much time to develop this ingenuity. By any reasonable definition of the good life, it is surely beyond question that both our nation and the world as a whole are already overpopulated. As "popollution" creates ever sharper and more striking crises, men will (I think) come more rapidly than anyone now realizes, to the conviction that society must take positive control of its numbers. Basically, man must do this because he has already willingly, and even gladly, increased his numbers by accepting the blessings of death control. To control death is to "play God." But we can never do merely one thing; we must now accept the hidden agenda of death control and play God a second time, fully controlling births, for the good of all of society; of posterity, especially.

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